

REMARKS

Claims 1-15 are pending in this application. By this amendment, the specification and claims 1, 3, 6, 8 and 11 are amended. No new matter is added. Reconsideration of the application is respectfully requested.

Claims 1, 3, 6, 8 and 11 are amended only to correct informalities, and thus are not narrowed by such amendments.

Applicants gratefully acknowledge that the Office Action indicates that claims 2-3 and 7-8 include allowable subject matter. However, for at least the following reasons, Applicants submit that all pending claims 1-15 are allowable.

I. Specification Objection

The Office Action objects to the specification because of an informality. The specification is amended to correct the informality. No new matter is added. Accordingly, withdrawal of the objection is respectfully requested.

II. Rejection Under 35 U.S.C. §103(a)

A. Rader in view of Kumagawa, Kudo and Takahara

The Office Action rejects claims 1, 4, 6, 9, 11 and 15 under 35 U.S.C. §103(a) over U.S. Patent No. 5,867,140 to Rader ("Rader") in view of U.S. Patent No. 6,663,272 to Kumagawa et al. ("Kumagawa"), U.S. Patent No. 5,861,863 to Kudo et al. ("Kudo") and U.S. Patent No. 6,545,653 to Takahara et al. ("Takahara"). Applicants respectfully traverse the rejection.

Neither Rader, Kumagawa, Kudo nor Takahara, alone or in combination, teach or suggest a driving method of a display device, a driving circuit of a display device, and a display device for driving pixels including selecting particular scanning lines, one for every horizontal scanning period with a selection voltage supplied to the selected scanning line for one of two split halves of the one horizontal scanning period; the polarity of the selection

voltage being inverted every two or more horizontal scanning periods; supplying each of the scanning lines other than the particular scanning lines with a non-selection voltage which is inverted in polarity with respect to the intermediate value every one or more vertical scanning periods; the particular data line being supplied with the on-display voltage and the off-display voltage for substantially equal periods within the one horizontal scanning period for the selected scanning line; supplying the data line other than the particular data lines with the off-display voltage for a period during which the particular scanning lines are consecutively selected; and the polarity of the off-display voltage is inverted in synchronization with the period of polarity inversion of the selection voltage, as set forth in independent claim 1 and similarly set forth in independent claims 6 and 11.

Rader teaches a display system 300 including a display panel 200 having a full display screen area 303 and a partial display field 305. See Fig. 3, col. 2, lines 21-30, and col. 6, lines 15-18. In a full display mode, an input switch 414 connects an input contact 426 with an output contact 430 to deliver pixel signals. See Fig. 4, and col. 6, lines 30-35. In a partial display mode, the input switch 414 connects an input contact 428 with output contact 430 so that the output of FIFO memory 416 which stores all of the pixel control signals for the partial image is re-circulated. See Fig. 4, col. 7, lines 8-10, and col. 5, lines 19-27. This allows the contents of the FIFO memory 416 to re-circulate while a DMA channel 406 and, optionally, a display image buffer 304 are disabled/powered down. See col. 5, lines 21-24. Although Rader teaches full and partial display modes, Rader does not even mention supplying a selection voltage, a non-selection voltage, an on-display voltage, and an off-display voltage during certain periods with respect to a horizontal scanning period, as set forth in claims 1, 6 and 11. Further, Rader does not even mention the combination of inverting a polarity of the selection voltage, non-selection voltage and off-display voltage

during certain periods with respect to a horizontal scanning period and a vertical scanning period, as set forth in claims 1, 6 and 11.

The Office Action admits that Rader does not teach or suggest a selection voltage, an on-display voltage, and off-display voltage, and a plurality of the selection voltage, and a plurality of the off-display voltage being supplied/inverted during the period set forth in claims 1, 6 and 11. However, the Office Action asserts that Kumagawa remedies the deficiencies of Rader. Specifically, the Office Action asserts that Kumagawa teaches supplying lighting and non-lighting voltages and different polarity voltages during certain periods with respect to a horizontal scanning period. See Figs. 25-26, and col. 34, line 63 - col. 35, line 6. However, Kumagawa does not remedy the deficiencies of Rader.

Kumagawa teaches, in Figs. 25-26, a half-wave rectifier that rectifies voltages and supplies the voltages at various times during a horizontal period 'th' to a bus line 202. See col. 34, lines 62 - col. 35, line 6. Kumagawa indicates that the voltage level is switched using an external switch in Fig. 25 or by an inverter circuit in the drive IC in Fig. 26. See col. 34, lines 64-66. Although Kumagawa arguably teaches that the voltage level is switched with respect to one horizontal scanning 'th', Kumagawa does not teach or suggest a separate selection voltage being supplied to selected scanning lines. Kumagawa merely teaches rectifying a voltage supplied by an external power source and supplying either a positive voltage or a negative voltage to a data line. Thus, Kumagawa does not teach or suggest inverting a polarity of a selection voltage for a period in which the selection voltage is supplied to the selected scanning line.

Therefore, Applicants respectfully submit that Kumagawa cannot reasonably be considered to teach or suggest the modification of Rader as alleged in the Office Action.

The Office Action admits that Rader and Kumagawa do not teach or suggest supplying each of scanning lines other than the particular scanning lines with a non-selection

voltage which is inverted in polarity with respect to the intermediate value every one or more vertical scanning periods. However, the Office Action asserts that Kudo remedies the deficiencies of Rader and Kumagawa. Specifically, the Office Action asserts that Kudo teaches supplying each of scanning lines other than particular scanning lines with a non-selection voltage which is inverted in polarity with respect to an intermediate value every one or more vertical scanning periods. However, Kudo does not remedy the deficiencies of Rader and Kumagawa.

Kudo does not teach a particular data line being supplied with an on-display voltage and an off-display voltage for substantially equal periods within one horizontal scanning period for the selected scanning line. Therefore, Applicants respectfully submit that Kudo cannot reasonably be considered to teach or suggest the modification of Rader and Kumagawa alleged by the Office Action.

Further, the Office Action admits that Rader, Kumagawa and Kudo do not teach or suggest the polarity of the selection voltage being inverted with respect to an intermediate value between a lighting voltage and a non-lighting voltage supplied to the data line, every two or more horizontal scanning periods. However, the Office Action asserts that Takahara remedies the deficiencies of Rader, Kumagawa and Kudo. Specifically, the Office Action asserts that Takahara teaches a polarity of the selection voltage being inverted every two horizontal scanning periods. However, assuming arguendo that Takahara could be considered to remedy this deficiency, Takahara does not remedy the deficiencies of Rader, Kumagawa and Kudo discussed above.

Therefore, independent claims 1, 6 and 11 would not have been rendered obvious by Rader, Kumagawa, Kudo and Takahara. Claim 4, 9 and 15 depend from claims 1, 6 and 11, respectively, and thus would also not have been rendered obvious by Rader, Kumagawa,

Kudo and Takahara. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Rader in view of Kumagawa, Kudo, Takahara and Yokota

The Office Action rejects claims 5 and 10 under 35 U.S.C. §103(a) over Rader, Kumagawa, Kudo, Takahara and U.S. Patent No. 6,181,313 to Yokota et al. ("Yokota"). Applicants respectfully traverse the rejection.

As discussed above, neither Rader, Kumagawa, Kudo nor Takahara teach or suggest the method and device respectively recited in claims 1, 6 and 11. Specifically, neither Rader, Kumagawa, Kudo nor Takahara teach or suggest the combination of supplying a selection voltage, a non-selection voltage, an on-display voltage, and an off-display voltage during certain periods with respect to a horizontal scanning period as set forth in claims 1, 6 and 11. Further, neither Rader, Kumagawa, Kudo nor Takahara teach or suggest the combination of inverting a polarity of the selection voltage, non-selection voltage and off-display voltage during certain periods with respect to a horizontal scanning period and a vertical scanning period, as set forth in claims 1, 6 and 11.

Yokota teaches a liquid crystal display controller including a drive duty selection register 34 and a drive by selection register 32. See Fig. 1, and Abstract. However, Yokota does not remedy deficiencies of Rader, Kumagawa, Kudo and Takahara discussed above.

Therefore, claims 1 and 6 would not have been rendered obvious by Rader, Kumagawa, Kudo, Takahara and Yokota. Claims 5 and 10 depend from claims 1 and 6, respectively, and thus would also not be rendered obvious by Rader, Kumagawa, Kudo, Takahara and Yokota. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. Rader in view of Kumagawa, Kudo, Takahara and Shimada

The Office Action rejects claims 12-14 under 35 U.S.C. §103(a) over Rader, Kumagawa, Kudo, Takahara and U.S. Patent No. 6,512,506 to Shimada ("Shimada").

Applicants respectfully traverse the rejection.

As discussed above, neither Rader, Kudo nor Takahara teach or suggest the display device recited in claim 11. Specifically, neither Rader, Kumagawa, Kudo nor Takahara teach or suggest the combination of supplying a selection voltage, a non-selection voltage, an on-display voltage, and an off-display voltage during certain periods with respect to a horizontal scanning period as set forth in claim 11. Further, neither Rader, Kumagawa, Kudo nor Takahara teach or suggest the combination of inverting a polarity of the selection voltage, non-selection voltage and off-display voltage during certain periods with respect to a horizontal scanning period and a vertical scanning period, as set forth in claim 11.

Shimada teaches a driving device including a picture element to having a non-linear element connected to the corresponding scanning electrode Yj and a liquid crystal element 2b connected to a corresponding data electrode Xi. See col. 2, line 31-40. However, Shimada does not remedy the deficiencies of Rader, Kumagawa, Kudo and Takahara discussed above.

Therefore, claim 11 would not have been rendered obvious by Rader, Kumagawa, Kudo, Takahara and Shimada. Claims 12-13 depend from claim 11, and thus would also not have been rendered obvious by Rader, Kumagawa, Kudo, Takahara and Shimada.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

III. Conclusion

In view of the foregoing, Applicants respectfully submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-15 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants undersigned representative at the telephone number set forth below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Holly N. Moore
Registration No. 50,212

JAO:HNM/kzb

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OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

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